

File West
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Memorandum for the Committee

A restatement of considerations concerning decontamination policy.

The main issues:

1. We know almost nothing that could give us a decisive answer to the consequences of implanting terrestrial microbes on Mars.

2. We are in a field very different from conventional experimental policy where we should be content with reasonable plausibility. About the only thing that we can say with assurance in this situation is that the potential stakes are very, very high. A policy that we can foresee having a crucial impact on the further history of the solar system cannot be pursued with the same casualness as the decision to perform another experiment in the laboratory or even with the caution that would apply to a concern solely for the expenditure of large amounts of money. The idea of a cataclysmic interposition has very few precedents in scientific history, and it would be dangerous to trust our intuitions in estimating levels of safety.

3. We do not even know all of the values at risk. They certainly include the possibility of clean exobiology, and the moral as well as scientific implications of an avoidable interference with another biogenic system. They also include a catastrophic interference in any other uses of Martian "real estate" that our human posterity might eventually discover.

4. We are in a slightly more favorable position with respect to the possible hazards of "back contamination". At least as a species we feel we have a title to the earth, and some idea of the hazards that we would prefer to defend it from. Mortal human disease is only one of a spectrum of ecological

interferences for which we have all too many precedents as consequences of terrestrial adventures.

5. We would be deluding ourselves with respect to the rigor of biological theory to make any strong assertions as to the probable nature of an encounter between two planetary biota. We have no idea how different, how like they may be. If they are very different from one another we can equally choose between two contrary arguments: (1) that an exotic species would fail to find adequate nutritional support on earth, or (2) that we would have had no opportunity to evolve the requisite immunological and other defenses against it. I would tend to agree with the speculation that an exotic virus would have a hard time in an eso cell. But an exo microbe needs find common ground at a much simpler level for its nutritional support, and our lysozymes which play such a central role in antimicrobial immunity can hardly be expected to be pre-adapted to exotic species. Quite apart from human pathology the earth's ecological balance could be upset in many other ways - a pest that excreted nitric oxide could reduce the whole earth to a facsimile of Los Angeles.

6. It is perhaps beyond human frailty to give an absolutely honest answer to the magnitude of acceptable risks at this time. Certainly very few people will give a great deal of their time for intensive study on the basis of the present very thin and indecisive knowledge of the Mars environment.

7. I remain very uneasy about the realizability of spacecraft decontamination, especially as it is virtually impossible to inspect and validate the results. The constant contamination load of the earth is such that even if the project hardware is sterilized at any instant of time, it is almost

impossible to keep it so while it remains under the earth's atmosphere. Serious consideration should then perhaps be given to the execution of terminal assemblies and checkout in extraterrestrial space, perhaps in orbit or on the moon. The distinction is a hostile environment in which special measures would have to be taken to preserve an exposed microbe rather than to exclude it.

8. The same considerations apply to back contamination. None of our experience with isolation laboratories on the earth is very reassuring, particularly against the second order dangers of system breakdown - for example, a boiler explosion, or its analogy, the loss of the re-entry capsule at some point before it was secured within the laboratory. Thus again operations on the moon could give us a kind of margin of safety that we must seek in this field.